FEM 1.209:360474

FLOOD INSURANCE STUDY

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GINAL

VILLAGE OF LATTINGTOWN, NEW YORK
NASSAU COUNTY

MARCH 18, 1986

Federal Emergency Management Agency

COMMUNITY NUMBER - **360474**

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FLOOD INSURANCE STUDY
VILLAGE OF LATTINGTOWN, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Lattingtown, Nassau County, New York, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to allow Lattingtown to continue participation in the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

This Flood Insurance Study was prepared by compiling pertinent information for the flood hazard areas in the Village of Lattingtown from existing technical and/or scientific data originally prepared by others for purposes other than the preparation of this Flood Insurance Study. This existing data was reviewed by FEMA prior to its use in the development of this Flood Insurance Study to ensure compliance with NFIP accuracy requirements.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The original analyses for this study were performed for the Federal Emergency Managment Agency (FEMA). This study was updated to incorporate the stillwater elevations for Long Island Sound determined during the preparation of the Flood Insurance Studies for the City of Glen Cove and the Town of Oyster Bay, and the stillwater elevations for Mill Neck Creek determined during the preparation of the Flood Insurance Study for the Village of Bayville. The wave height analyses for these flooding sources were performed by Dewberry and Davis. The work for the wave height analyses was completed in February 1985.

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1.3 Coordination

The New York State Department of Environmental Conservation provided surveyed cross sectional information and aerial photographs showing erosion hazard areas for the Village of Lattingtown. On May 1, 1985, the results of the study were reviewed at a final Consultation and Coordination Officer's (CCO) meeting attended by representatives of FEMA and the Village of Lattingtown.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Lattingtown, Nassau County, New York. The area of study is shown on the Vicinity Map (Figure 1).

Tidal flooding including its wave action from Long Island Sound and Mill Neck Creek was studied by detailed methods. The areas studied by detailed methods were selected based upon the extent and validity of available existing hydrologic and hydraulic data.

2.2 Community Description

The Village of Lattingtown is located in northeastern Nassau County in New York, approximately 16 miles east of the City of New York corporate limits at Queens . It is bordered by the Town of Oyster Bay to the east and south, the Village of Bayville and the Village of Mill Neck to the east, the City of Glen Cove to the west, and Long Island Sound to the north. Mill Neck Creek and Long Island Sound are the principal sources of flooding in the community.

The topography of Lattingtown is irregular, with low-lying marshy areas draining into Frost Creek to the north. Higher ground in the south rises to approximately 200 feet. In the higher elevations, the land has a dense cover of trees.

Lattingtown has a moderate coastal climate, with warm, humid summers and moderately cold winters. The average temperature is 51.4 degrees Fahrenheit (°F), ranging from a low monthly average of 31.8°F in February to a high monthly average of 72.1°F in July. Precipitation averages from 40 to 45 inches annually and is evenly distributed over all months of the year (Reference 1).

2.3 Principal Flood Problems

The Village of Lattingtown is subject to coastal flooding caused by northeasters and hurricanes. Northeasters can occur at any time of the

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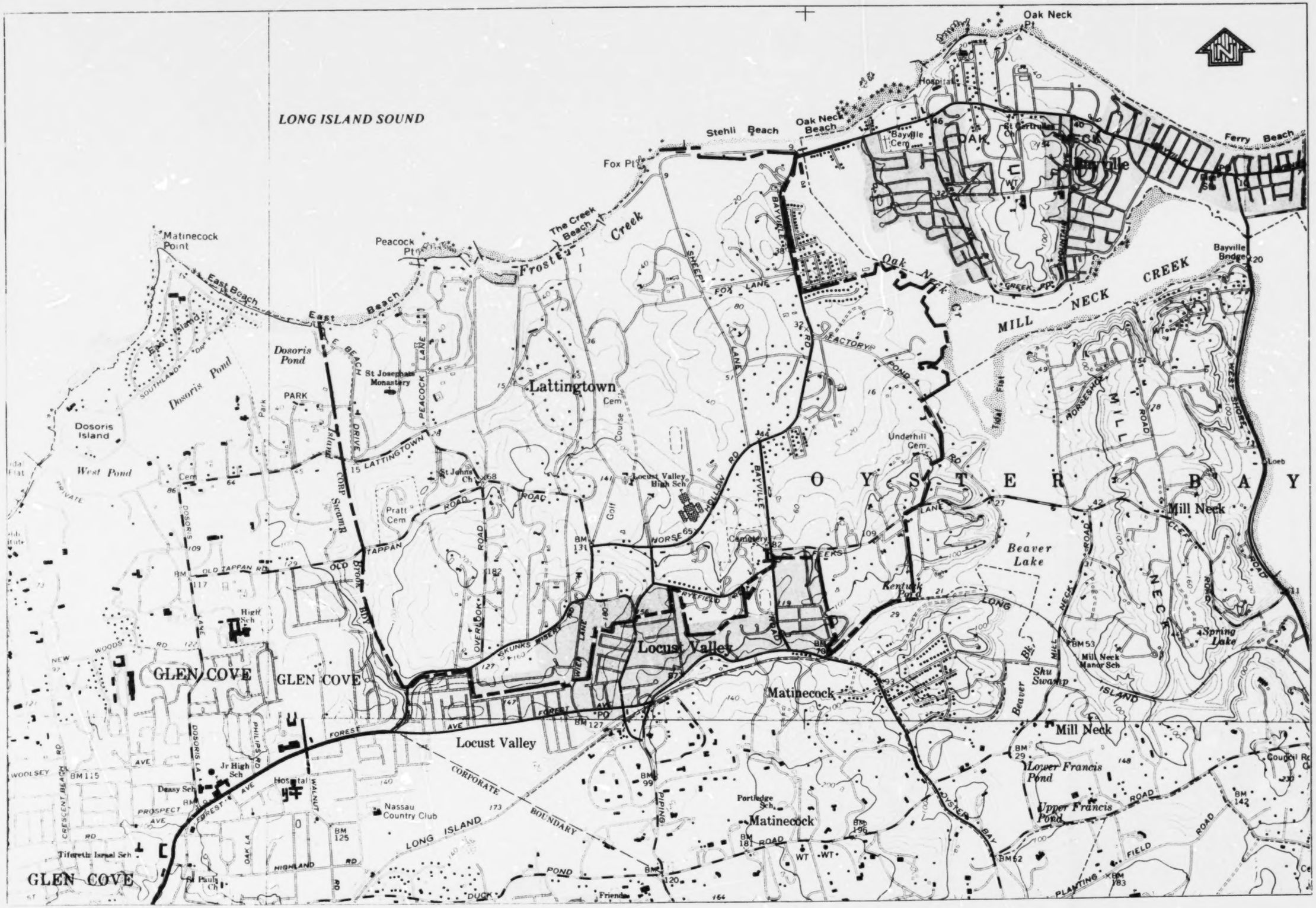
VICINITY MAP



APPROXIMATE SCALE
0 2000 4000 8000 FEET

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF LATTINGTOWN, NY
(NASSAU CO.)

FIGURE 1

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year but are more prevalent in the winter months, whereas hurricanes occur in the late summer and early fall months.

The storm of record was the hurricane of September 21, 1938, which produced a storm tide elevation of 13.7 feet at the Willets Point, New York, tidal elevation gaging station, and a storm tide elevation of 11.0 feet at the Stamford, Connecticut, tidal elevation gaging station. Hurriccane Carol, on August 31, 1954, produced the second highest storm tide elevations at Willets Point and Stamford, of 11.7 feet and 10.3 feet, respectively. A northeaster occurred on February 6-7, 1978, and resulted in the third highest storm tide elevations of 10.7 feet at Willets Point and 9.8 feet at Stamford (Reference 2). A summary of major storms occurring from 1938 through 1978 which have affected the community is presented in the following tabulation:

Storm-Type and Date	Willets Point Elevation (feet)	Stamford Elevation (feet)
Hurricane September 21, 1938	13.7	11.0
Northeaster November 25, 1950	10.0	9.5
Northeaster November 6-7, 1953	9.0	9.2
Hurricane Carol August 31, 1954	11.7	10.3
Northeaster April 13, 1961	8.9	8.4
Northeaster March 6-8, 1962	8.8	8.4
Northeaster February 19, 1972	9.4	9.0
Northeaster February 6-7, 1978	10.7	9.8

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3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Analyses were carried out to establish the peak elevation-frequency relationships for the flooding sources studied in detail affecting the community.

The stillwater elevations for Long Island Sound were determined by interpolating between the elevations obtained from the Flood Insurance Study for the City of Glen Cove and the Flood Insurance Study for the Town of Oyster Bay (References 3 and 4). The stillwater elevations for Mill Neck Creek were directly obtained from the Flood Insurance Study for the Village of Bayville (Reference 5).

The stillwater elevation is the elevation of the water due solely to effects of the astronomical tides, storm surges, and wave set-up on the water surface. The inclusion of wave heights increases the water-surface elevations. The wave crest elevation is the sum of the stillwater elevation and the portion of the wave height above the stillwater elevation. The addition of wave heights to stillwater-storm surge elevations was performed using methodology recommended by the National Academy of Sciences (NAS) (Reference 6).

The stillwater elevations of the selected recurrence intervals are shown in Table 1, "Summary of Stillwater Elevations."

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TABLE 1 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
LONG ISLAND SOUND				
Western corporate limits	10.0	12.3	13.3	15.2
Peacock Point	9.8	11.9	12.9	14.9
Fox Point	9.4	11.3	12.3	14.3
Eastern corporate limits	9.3	11.1	12.1	14.2
MILL NECK CREEK				
Entire shoreline within community	9.3	11.1	12.1	14.2

3.2 Hydraulic Analyses

Hydraulic analyses of the shoreline characteristics of the flooding sources studied in detail were carried out to provide estimates of wave heights and corresponding wave crest elevations of floods of the selected recurrence intervals along each of the shorelines.

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The COE has established the 3-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (Reference 7). The 3-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame or brick veneer structures.

The methodology for analyzing wave heights and corresponding wave crest elevations was developed by the NAS (Reference 6). The NAS methodology is based on three major concepts.

First, a storm surge on the open coast is accompanied by waves. The maximum height of these waves is related to the depth of water by the following equation:

$$H_b = 0.78d$$

where H_b is the crest to trough height of the maximum or breaking wave and d is the stillwater depth. The elevation of the crest of an unimpeded wave is determined using the equation:

$$Z_w = S_* + 0.7H_* = S_* + 0.55d$$

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where Z_w is the wave crest elevation, S_* is the stillwater elevation at the site, and H_* is the wave height at the site. The 0.7 coefficient is the portion of the wave height which reaches above the stillwater elevation. H_b is the upper limit for H_*.

The second major concept is that the breaking wave height may be diminished by dissipation of energy by natural or man-made obstructions. The wave height transmitted past a given obstruction is determined by the following equation:

$$H_t = BH_i$$

where H_t is the transmitted wave height, H_i is the incident wave height, and B is a transmission coefficient ranging from 0.0 to 1.0. The coefficient is a function of the physical characteristics of the obstruction. Equations have been developed by the NAS to determine B for vegetation, buildings, natural barriers such as dunes, and man-made barriers such as breakwaters and seawalls (Reference 6).

The third concept deals with unimpeded reaches between obstructions. New wave generation can result from wind action. This added energy is related to distance and mean depth over the unimpeded reach.

These concepts and equations were used to compute wave heights and wave crest elevations associated with the 100-year storm surge. Accurate topographic, land-use, and land cover data are required for the wave height analysis. Maps of the study area at a scale of 1:4,800, with a contour interval of 5 feet, were used for the topographic data (Reference 8). The land-use and land cover data were obtained from aerial photographs (Reference 9).

Wave heights were computed along transects (cross section lines) that were located along the coastal areas, as illustrated in Figure 2. The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, they were spaced at larger intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects. Table 2, "Transect Descriptions," provides a listing of the transect locations and stillwater elevations, as well as initial wave crest elevations.

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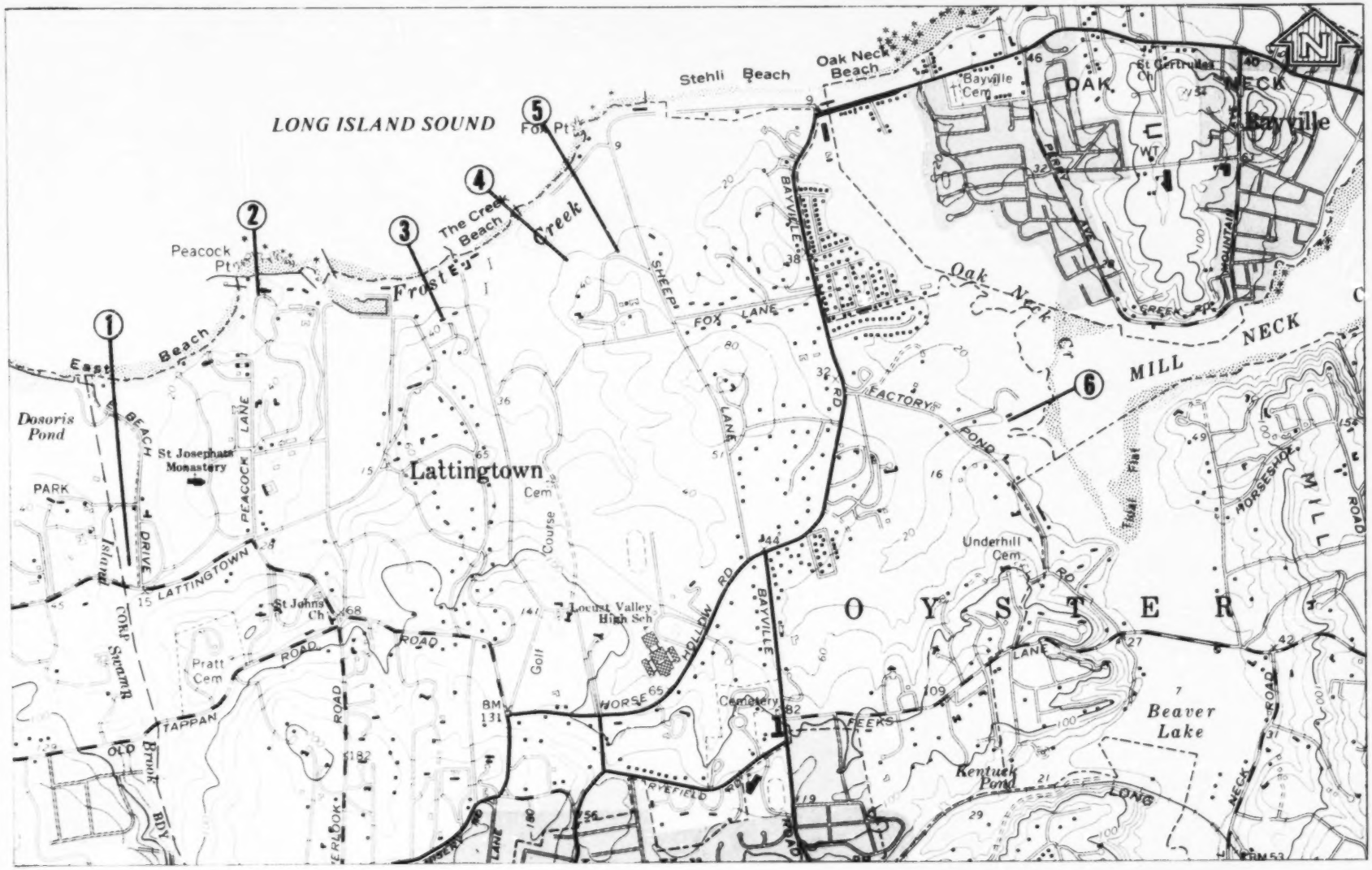

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF LATTINGTOWN, NY

(NASSAU CO.)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

TRANSECT LOCATION MAP

TABLE 2 - TRANSECT DESCRIPTIONS

Transect	Location	Elevation (feet) Stillwater 100-year	Elevation (feet) Maximum Wave Crest 100-year
1	Long Island Sound from the Lattingtown/ Glen Cove corporate limits to Peacock Point	13.2	20
2	Long Island Sound from Peacock Point to Frost Creek Harbor	12.9	20
3	Long Island Sound from Frost Creek Harbor to the tidal pool	12.6	19
4	Long Island Sound at the opening of the tidal pool	12.5	19
5	On Long Island Sound from the tidal pool to the Lattingtown/Oyster Bay corporate limits	12.4	19
6	Shoreline of Mill Neck Creek	12.1	15

Each transect was taken perpendicular to the shoreline and extended inland to a point where wave action ceased. Along each transect, wave heights and wave crest elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. The 100-year stillwater elevations were used as the starting elevations for these computations. Wave heights were calculated to the nearest 0.1 foot, and wave crest elevations were determined at whole-foot increments along the transect. The location of the 3-foot breaking wave for determining the terminus of the V zone (area with velocity wave action) was also computed at each transect.

Figure 3 is a profile for a typical transect illustrating the effects of energy dissipation and regeneration on a wave as it moves inland. This figure shows the wave crest elevations being decreased by obstructions, such as buildings, vegetation, and rising ground elevations, and being increased by open, unobstructed wind fetches. Actual wave conditions in the community may not include all the situations illustrated in Figure 3.

After analyzing wave heights along each transect, wave crest elevations were interpolated between transects. Various source data were used in the interpolation, including the topographic work maps, notes and photographs taken during field inspection, and engineering judgment. Controlling features affecting the wave crest elevations were identified and considered in relation to their positions at a particular transect and their variation between transects. The results of the calculations are accurate until local topography, vegetation, or cultural development within the community undergo any major changes.

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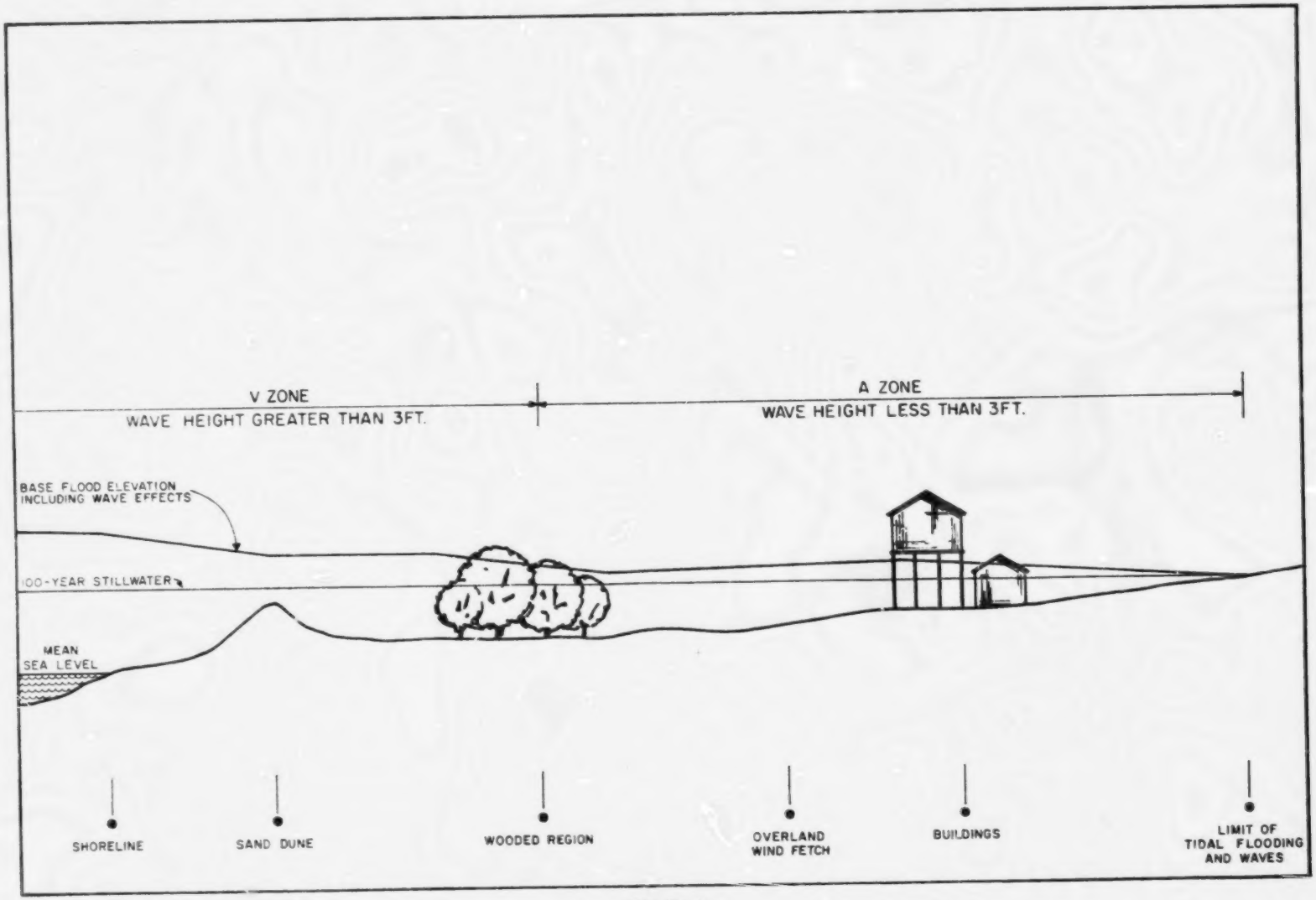

FIGURE 3
TYPICAL TRANSECT SCHEMATIC

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community.

For the tidal areas with wave action, the flood boundaries have been delineated using the elevations determined at each transect; between transects, the boundaries were interpolated using engineering judgment, land cover data, and topographic maps (References 8 and 9). The 100-year flood plain was divided into whole-foot elevation zones based on the average wave crest elevation in that zone. Where the map scale did not permit these zones to be delineated at one-foot intervals, larger increments were used.

The 100- and 500-year flood plain boundaries are shown on the Flood Insurance Rate Map (Exhibit 1). In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for the flooding sources studied in detail in the Village of Lattingtown.

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5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard. In areas where a wave height analysis was performed, reaches were determined for areas of the coastline, represented by a transect or group of transects, which have the same physical characteristics. The reaches determined for the tidal flooding sources in Lattingtown are summarized in the Flood Insurance Zone Data Table (Table 3).

TABLE 3 - FLOOD INSURANCE ZONE DATA

Flooding Source	Stillwater Elevation 10-Year	100-Year	FHF	Zone	Base Flood Elevation (Feet NGVD)*
Long Island Sound					
Transect 1	10.0	13.2	050	V10	15-20
			045	A9	13-15
			035	A7	13
Transect 2	9.8	12.9	050	V10	15-20
			045	A9	13-15
Transect 3	9.6	12.6	045	V9	15-19
			045	A9	13-15
Transect 4	9.5	12.5	045	V9	15-19
			045	A9	13-15
Transect 5	9.5	12.4	045	V9	15-19
			045	A9	12-14
			035	A7	12-14
Mill Neck Creek					
Transect 6	9.3	12.1	045	V9	14-15
			040	A8	12-14
			030	A6	12

*Due to map scale limitations, base flood elevations shown on the FIRM may represent average elevations for the zones depicted.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

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The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zones A6, A7, A8, and A9:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations are shown, and zones subdivided according to FHF.
Zones V9 and V10:	Special Flood Hazard Areas along coasts inundated by the 100-year flood that have additional velocity hazards associated with waves of 3-foot amplitude or greater; with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 3.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Village of Lattingtown is, for insurance purposes, the principal result of the Flood Insurance Study.

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This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

This Flood Insurance Study was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared by other organizations originally for purposes other than the preparation of this Flood Insurance Study. The data were identified as the best available at the time of compilation of this Flood Insurance Study and should depict the general conditions of the flooding sources with relative accuracy. FEMA performed a cursory review and accepted the data as valid for purposes of this Flood Insurance Study and the NFIP. However, if better information is known to exist or has been developed since the date of this report, the information should be immediately forwarded to the Natural and Technological Hazards Division, Federal Emergency Management Agency (Regional Director, Region II Office, 26 Federal Plaza, Room 19-100, New York, New York 10278) for consideration for revision of this study.

The Flood Insurance Studies for the City of Glen Cove, the Town of Oyster Bay, the Village of Bayville, and the Village of Mill Neck have been prepared (References 3, 4, 5, and 10). The results of those studies are in complete agreement with the results of this study for Lattingtown.

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the National Flood Insurance Program.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 19-100, New York, New York 10278.

8.0 BIBLIOGRAPHY AND REFERENCES

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